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## ANWALTSSOZIETÄT

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| PCT/EP03/11550 | | K30064PCT | February 13, 2006 |

King Abdulaziz & His Companion Foundation for the Gifted

On the written opinion dated January 13, 2006.

We herewith submit a new claim 1 to replace the originally filed claim 1.

## I.

## Amendments

New claim 1 was amended by adding "in one word" to feature b) thereof, as originally disclosed by the third and the last paragraph on page 4 of the description.

- 94.365 -

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## II.

### Novelty

Cited document D1 discloses a computer implemented method of determining if a word is from a target language. In this context, the term "word" is defined (cf column 3, lines 11 to 13 in D1) to mean a string of characters that as ordered have meaning in a given language. The method disclosed comprises decomposing the word into a plurality of non-overlapping n-grams covering the entire word without gaps and without crossing word boundaries and including a first n-gram, one or more following n-grams, if present, and a last n-gram. (cf. claim 1; column 2, lines 50 to 56, column 3, line 45 to column 4, line 3; column 4, lines 62 to 64). This implies that according to this method, any word is decomposed into at least two distinct n-grams (i.e. at least a first and a last n-gram). To identify the word of a particular language the word is therefore split into a sequence of n-grams based on n-gram statistics from a language's lexicon (cf. column 3, lines 22 to 24 and lines 45 to 54).

However, document D1 does not (explicitly) disclose any input means or inputting at least one character by said input means, respectively. We respectfully disagree with the Examiner on this point with regard to the passage cited in the written opinion (cf column 2, lines 59 – 62) referring to any "inputting of at least one character by said input means". Rather, the method disclosed in D1 is applied to entire (i.e. existing in their entirety before the method is applied) documents (cf. column 2, lines 29 to 42, referring to "correctly identifying the language of words even when the <u>document</u> contains multiple languages (e.g. Canadian Parliamentary Proceedings containing both English and French)" as well as "the language identification statistics for the individual words of a <u>document</u> can be combined to identify the overall language of a <u>document</u>". Further, the subject matter of D1 does not disclose "checking of said at least one character and/or a <u>sequence of characters</u> in one word by utilizing a number of predetermined rules related to the <u>sequence of characters</u>", since, as pointed out above, a method disclosed in D1 deals with entire words decomposed into a <u>sequence of n-grams</u> (rather than a sequence of characters) using n-gram statistics from a language's lexicon. At least for these reasons, the subject matter of claim 1 is novel over the disclosure of D1.

While not discussed in the written opinion, we also submit that new claim 1 is novel over cited document D2. In document D2, a method and apparatus for judging the character mode

likelihood of a string of characters keyed in by the user is disclosed, the judging being based on the likelihood value of the input character string obtained for each of a plurality of character or language types (cf col 3, lines 1 – 11 and 18 – 25).

To this end, the frequency of occurrence of _each_ character is acquired beforehand for each character mode and the likelihood value of a character string in question is computed by inserting into the formula given in column 10 the frequency of each character contained in that character string (cf. column 9, line 9 to column 10, line 24, and figure 3).

Accordingly, this method relies on charaeter mode likelihood tables, such as tables 2-A, 2-B or 3, related to single characters. The teachings of D2 therefore do not disclose a feature of "checking of said at least one character and/or a sequence of characters by utilizing a number of predetermined rules related to the sequence of characters". For at least this reason, claim 1 of the present invention should also be found to be novel over the disclosure of D2.

Consequently, the subject matter of claim 1 is novel over the cited prior art.


### III.

**Inventive Step**

We submit that the subject matter of new claim 1 is also inventive over the prior art cited by the Examiner. In the following, the problem-solution-approach will be used.

For the present evaluations and as suggested in the written opinion, we consider D1 to be the closest prior art. D1 discloses a computer method for identifying the words of a particular language, wherein each word is split into a sequence of n-grams from a postulated language without overlaps, gaps or leftover letters on the basis of a matching expression, also known as a regular expression (cf. column 3, lines 14 to 31). To construct this regular expression, n-gram statistics from a language's lexicon, specifying whether the n-gram occurred at the beginning, end or middle of the word is used. The subject matter according to the present invention differs from the disclosure of D1 in that, in the present invention, sequences of characters within one word are automatically checked by utilizing a number of predetermined rules re-

lated to the sequence of characters. In other words, it is not a word which, in its entirety, is decomposed into a sequence of non-overlapping n-grams to be checked subsequently based on n-gram statistics, but rather a sequence of characters within one word being checked utilizing a number of predetermined rules related to the sequence of characters. These differences have the effect that the present invention produces results as to the language to which the sequence of characters is ascribed and a corresponding output before the user has finished keying in the entire word (see e.g. pages 6/7 referring to the flow diagram shown in Fig. 1 of the present application and in particular steps 30 and 32 therein), and is therefore much faster and more reliable.

As pointed out above, the teachings of D1 are applicable to single words in isolation or larger collections of words (cf. column 5, lines 53 to 66), but not to a sequence of characters within one word. Turning therefore to the teachings of document D2, disclosed therein is a method for judging the language type of an input character string, wherein the judging is based on the likelihood value of the input character string obtained by a mathematical expression, which in turn is based on the likelihood values of the individual characters appearing in said string (cf. e.g. column 3, lines 1 to 25 and column 9, line 9 to col. 10, line 30). Thus, the teachings of D2 go to the other extreme by using statistics of likelihood values of <u>single characters</u> to judge the language type of an input character string (see e.g. figures 5 and 16 as well as the concomitant sections of the description in D2). Accordingly, from the teachings of D2, no hints can be gathered as to checking for the character set of a sequence of characters by utilizing a number of predetermined rules related to the sequence of characters, since at no point in D2 (a rule related to) a sequence of characters is referred to (cf. tables 2-A, 2-B and 3 as well as column 10, lines 6 to 30). The method disclosed in D2 therefore requires to have tables such as tables 2-A, 2-B or 3, respectively, stored in memory and to decompose a character string into single characters. Thus, the teachings of D2 provide, if at all, a very different solution to the above stated problem, which at the same time is more difficult to implement and requires the usage of extra resources as compared to the solution according to the present invention.

Accordingly, subject matter of independent claim 1 involves an inventive step over D1 alone or in combination with D2.
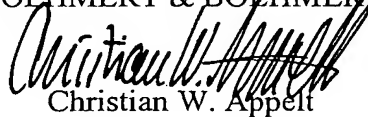
The claims 2 to 9 dependent on claim 1 are allowable with a novel and inventive independent claim 1.

The use-claim 10 refers back to a method according to the preceding claims, so that the same argumentation as mentioned above is applicable. Also the device-claims 11 to 13 refer directly or indirectly back to method-claim 1, so that also for the device claims the above argumentation is applicable. Also claims 10 to 13 should be therefore allowable and especially should be considered as novel and inventive over the prior art.

## IV.

It is therefore respectfully requested to reconsider the objections raised in the written opinion and in the light of the aforesaid so as to result in a positive International Preliminary Examination Report (IPER) both with respect to novelty and inventions.

BOEHMERT & BOEHMERT

Christian W. Appelt

Enclosure:
One copy hereof
New claim 1, in duplicate

## **Amended claim 1**

1. Method for operating an output device and for outputting text data in one of at least two languages with at least partly different character sets by utilizing only one input means for all languages comprising the following steps:

   a) Inputting at least one character by said input means;

   b) Automatic checking of said at least one character and/or a sequence of characters in one word by utilizing a number of predetermined rules related to the sequence of characters;

   c) Automatic outputting of said character or sequence of characters with a first character set of a first language, if the sequence is allowed in said first language according to said predetermined rules;

   d) Automatic outputting of said character or sequence of characters with a second character set of a second language, if the sequence is not allowed in said first language according to said predetermined rules.